24043

B.Tech. 3rd Semester Information Technology

(Branch–VI) Examination, December–2013

DIGITAL ELECTRONICS

Paper–EE-204-F

Time allowed : 3 hours] *[Maximum marks : 100*

Note : Question No. 1 is compulsory. *Attempt any one question from each section.*

1. (a) Realize three basic gates (AND, OR and NOT) using NAND gates only. 5

(b) Differentiate between Serial and Parallel Adder. 5

(c) Differentiate between Synchronous and Asynchronous Counters. 5

(d) Explain PLA in brief. 5

Section–A

2. (a) Convert the following :

(i) $(885)_{16} = (\text{---------})_2$

(ii) $(111\ 111\ 000\ 101101001)_2 = (\text{--------})_{16}$

(iii) $(10\ 111\ 111)_2 = (\text{--------})_8$

(iv) $(5624.37)_8 = (\text{----------})_2$

(v) $(1010010)_2 = (\text{---------})_{10}$ 10

(b) Minimize the following expression using K-Map and realize it using basic gates.

$Y = \sum m (1, 2, 9, 10, 11, 14, 15)$ 10

3. (a) Simplify the given expression using the Qunie-McCluskey minimisation technique and realize it using basic gates.

$Y(A, B, C, D) = \sum m (0, 1, 3, 7, 8, 9, 11, 15)$ 15

(b) Explain Error detecting and Error Correcting Codes with an example of each. 5

Section–B

4. (a) Describe the half-Adder circuit with its truth table and realize it using basic gates. 10

(b) What do you mean by Multiplexer ? Realize 32:1 Multiplexer using two 16:1 Multiplexers. 10

5. (a) Implement the given expression using 8:1 Multiplexer.

$f(A, B, C, D) = \sum m (0, 2, 3, 6, 8, 9, 12, 14)$ 10

(b) Explain the function of Demultiplexer in detail with its circuit diagram. 10

Section–C

6. (a) Explain the working of a Master-Slave J-K Flip-Flop with neat and clean diagram. 10

   (b) Design a 2-bit Asynchronous UP counter and explain it using timing diagram. 10

7. (a) What do you mean by Race-Around Condition ? How will it be removed ? 10

   (b) Design a Mod-5 Synchronous counter using J-K flip-flop and draw its state diagram. 10

Section–D

8. (a) Differentiate between RAM and ROM including their advantages, disadvantages and applications. 10

   (b) What is PLA ? Explain various blocks of PLA. 10

9. (a) What is PAL ? Explain in detail. 10

   (b) Explain different types of Hazards in combinational circuits. 10